PRODUCTION OF BIOFERTILIZER FROM VERMICOMPOSTING OF LANDFILL LEACHATE USING EARTHWORMS

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ABSTRACT

Nowadays, the accumulation of waste in landfill site is largely due to increasing of urbanization and industrialization in Malaysia. The non-proper management of wastes have worsened the condition whereby the amount of leachate produced from the waste led to critical environment issue. Thus, the objective of the study was to determine the effects of vermicomposting of landfill leachate using earthworms on biofertilizer production in 31 days. Liquid leachate that majorly consist of organic matter can yield highly nutritive biofertilizer through vermicomposting process. The process used earthworms to convert organic matter in leachate into plant-nutrients that enhance the growth of the plants and plants productivity. The amount of nitrate (N), phosphorus (P) and potassium (K) in vermicompost was found to increase while pH and number of earthworms declined at the end of the vermicomposting period. The vermibin containing 90 earthworms (approximately 52g) in a mixture of 150 ml of leachate and 800 g of soil obtained the highest concentration of NPK in vermicompost compared to those containing 39 earthworms and 15 earthworms. This indicates that the concentration of NPK increased with the high amount of earthworms. The number of earthworms decreased with decrease in pH in all vermibins after 31 days of vermicomposting period. V1 experienced increase 53–fold in N, 194-fold in P and 210–fold in K with 6.13 in pH after vermicomposting period due to earthworm activity during the process, thus improving the number of leaves (32 leaves). The data shows that vermicomposting is a suitable technology for the decomposition of landfill leachate into nutritive biofertilizer.

ABSTRAK

Masakini, perlonggokkan sampah di tapak pelupusan sampah majority adalah disebabkan oleh kemajuan pembangunan dan perindustrian di Malaysia. Pengurusan yang tidak terurus telah menyebabkan keadaan bertambah buruk di mana sejumlah air sisa yang pekat terhasil daripada tapak pelupusan telah menyebabkan isu pencemaran yang kritikal. Oleh itu, objektif kajian ini adlaah untuk mengenalpasti kesan vermicompost daripada air sisa sampah menggunakan cacing untuk menghasilkan biofertilizer. Cecair sampah yang mengandungi kebanyakannya adalah daripada bahan organic, di mana boleh menghasilkan biobaja yang berkhasiat melalui proses vermikompos. Proses ini yang menggunakan cacing untuk menukarkan bahan organik kepada nutrient pokok yang dapat meningkatkan pertumbuhan dan produktiviti pokok. Selepas proses vermikompos, kandungan nitrat (N), fosforus (P) dan potassium (K) didapati meningkat sementara pH dan bilangan cacing menurun. Vermikompos yang mengandungi 90 cacing yang dicampur 150 ml cecair sampah dan 798 g tanah menunjukan kandungan NPK yg paling tinggi berbanding vermikompos yg megandungi 39 dan 15 cacing. Ini menunjukan kandungan NPK yang tinggi dipengaruhi oleh bilangan cacing yang banyak. Sebaliknya, bacaan pH dan bilangan cacing menurun selepas 31 proses vermikompos. Disebabkan aktiviti cacing ketika proses, V1 menunjukan peningkatan NPK sebanyak 53-194-210 kali ganda, lalu meningkatkan bilangan daun. Hasil penyelidikan menunjukan vermikompos teknologi sesuai untuk penguraian organic di dalam cecair sampah kepada biobaja yang berkhasiat.

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